(No Model.)

T. F. NEVINS.

SECONDARY BATTERY.

No. 427,789. Patented May 13, 1890.

Fig. 1.

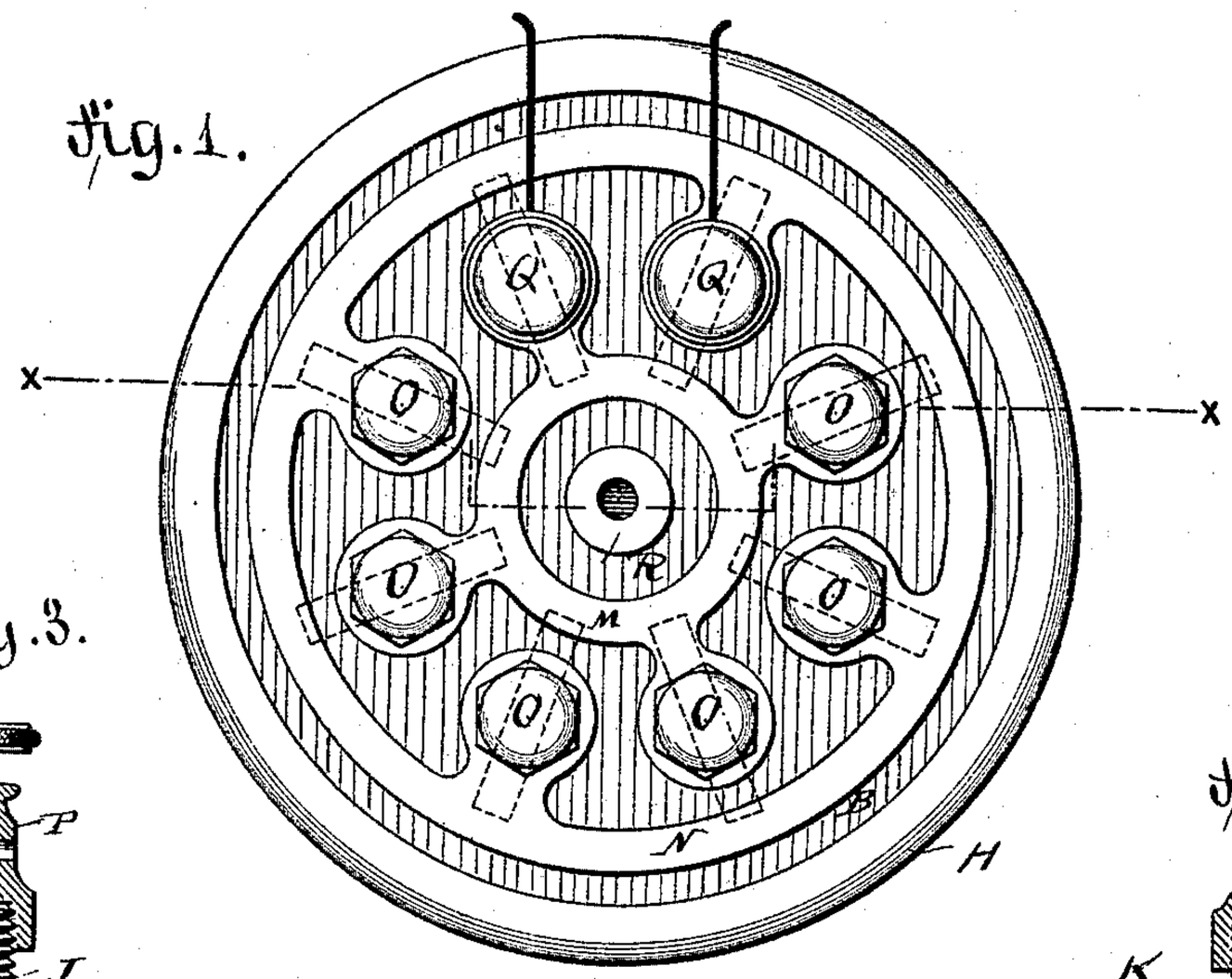


Fig. 3.

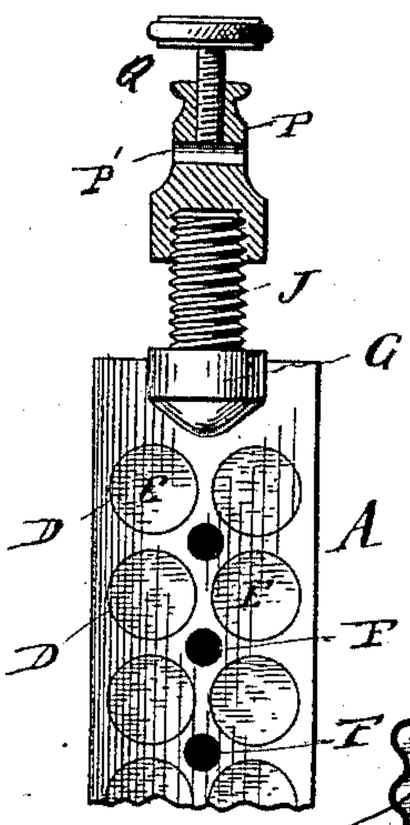


Fig. 2.

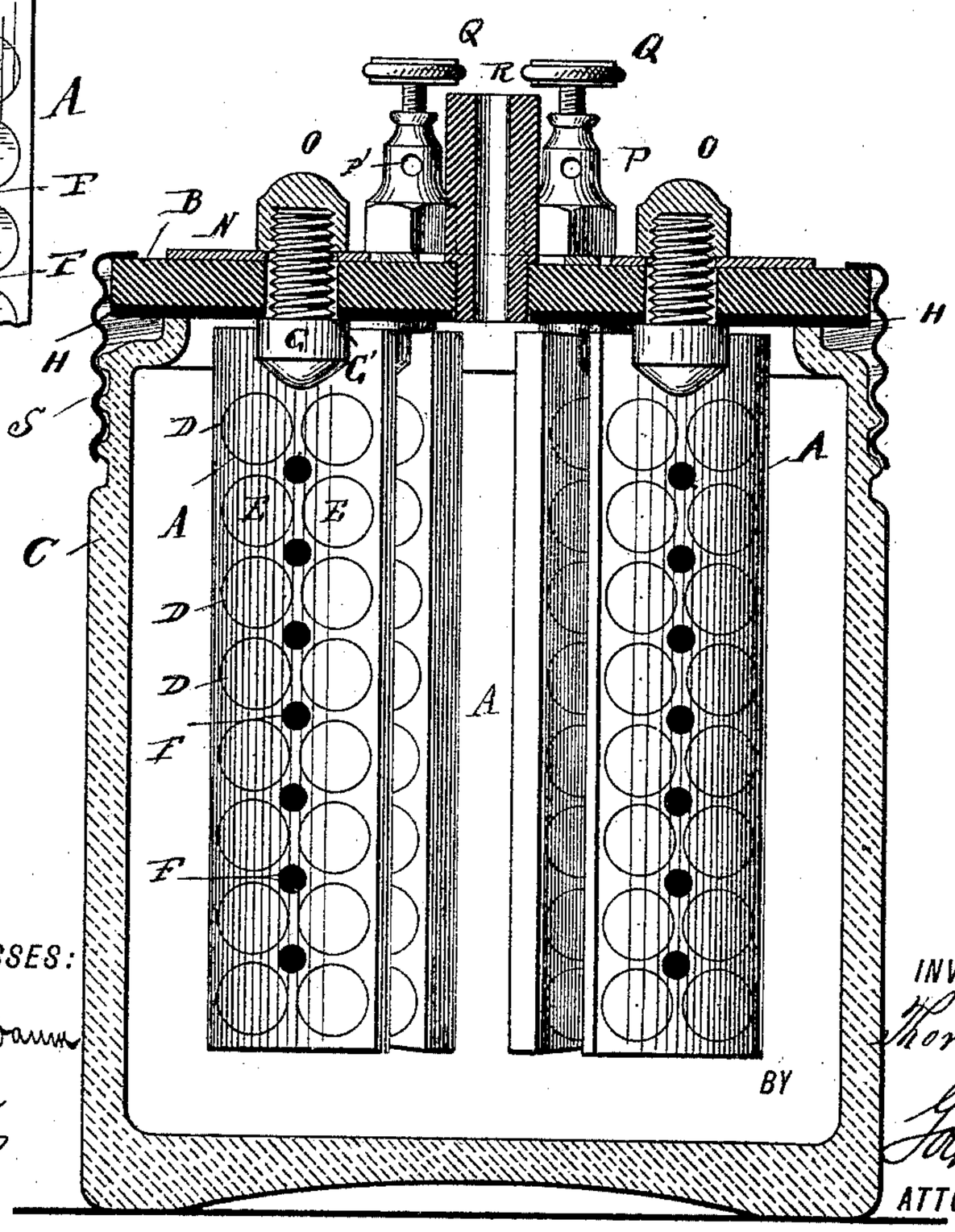
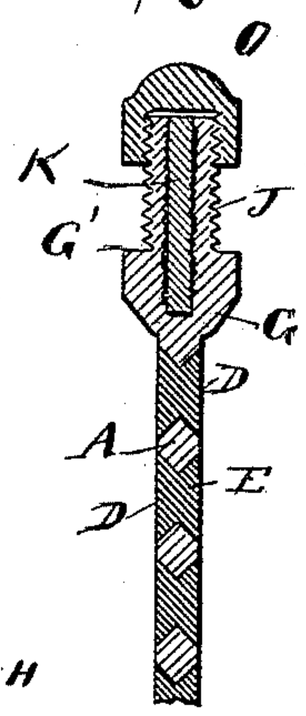


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS F. NEVINS, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO JOHN W. CARTER AND HARRY CAREY, BOTH OF SAME PLACE.

SECONDARY BATTERY.

SPECIFICATION forming part of Letters Patent No. 427,789, dated May 13, 1890.

Application filed December 8, 1888. Renewed April 9, 1890. Serial No. 347,184. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. NEVINS, of Brooklyn, in the county of Kings and State of New York, a citizen of the United States, have invented certain new and useful Improvements in Secondary Batteries, of which the following is a specification.

The object of my invention is to provide a new and improved secondary battery, which is simple in construction, compact, and durable.

The invention consists in the construction and combination of parts and details, as will be fully described hereinafter, and finally be pointed out in the claims.

In the accompanying drawings, Figure 1 is a top view of my improved secondary battery. Fig. 2 is a vertical transverse sectional view of the same on line *x x*, Fig. 1. Fig. 3 is a detail view of the upper end of one electrode, parts being in section. Fig. 4 is a cross-section of Fig. 3.

Similar letters of reference indicate corresponding parts.

The electrodes or plates A are suspended from the cover B, resting on the top of the jar C, said cover being made of ebonite or other suitable insulating material. The electrodes are composed of an alloy of lead and tin, containing not more than thirty parts of tin. The electrodes or plates have two vertical rows of apertures D, the edges of which are beveled inward from both faces of the electrode, so as to form pockets for receiving the filling E of the oxide of lead. Additional apertures F are provided between the apertures D to permit of a thorough circulation of the exciting-liquid. Each electrode is provided at its upper end with a projection G, the top of which forms the shoulders G′, which can rest against the rubber packing-plate H on the under side of the cover B. From the projection G a threaded stem J projects upward, and the same contains a threaded core K, of iron, for the purpose of rendering the stem J more durable. Said stems are passed through apertures in the plate B and through apertures in the lugs of two rings M and N on the upper surface of the cover. The lugs of the rings M and N alternate, as shown, so that the plates or electrodes are alternately held in the lugs of the rings M and N. The ring M is to be connected with the positive wire and the ring N with the negative. Nuts O are screwed on those ends of the stems J projecting above the rings. By drawing said nuts tight the electrodes are held in place and the rings M and N clamped firmly on the top of the cover B. A nut on one lug of the ring M and another nut on one lug of the ring N are provided with a projection P, having an aperture P′, through which the conducting-wire can be passed, a binding-screw Q being screwed into the said extensions P, so that the nut serves as a combined nut and binding-post.

A vent-tube R projects through the top of the cover to permit the escape of gases. A screw-ring S is screwed on the jar C, and its flange, pressing on the cover B, presses the rubber packing-plate H on the top edge of the jar, thus forming a close and tight joint. The electrodes are arranged radially, as shown in Fig. 1.

This battery is very simple in construction, the electrodes can easily be removed, and any one electrode that has become destroyed can easily be replaced by another. The oxide of lead is held securely in beveled apertures, and the electrodes, composed of an alloy of lead and tin, are very durable and do not become disintegrated or granulated by the action of the exciting-liquid.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a secondary battery, an electrode having a series of apertures, the edges of which are beveled inward from both faces of the electrode, and a series of apertures between said beveled apertures, substantially as set forth.

2. In a secondary battery, an electrode having a screw-threaded stem on its upper end made integral with said electrode, and a threaded iron core in said stem, substantially as set forth.

3. In a secondary battery, the combination,

with a jar and cover, of two rings on the top of the cover, which rings have apertured lugs, electrodes provided with screw-threaded stems passed through apertures in the cover and through the apertures in the lugs, and nuts screwed on the upper end of said stems, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

THOS. F. NEVINS.

Witnesses:

OSCAR F. GUNZ,

JOHN A. STRALEY.